
UTAH DEPARTMENT OF TRANSPORTATION

TECHNICAL BULLETIN MT-02.01

October 10, 2002

Ultra-Thin Whitetopping

Ultra-Thin Whitetopping (UTW) is a process where a thin layer of concrete (2 to 4 in.), usually with fibers and often of high strength, is placed over a prepared surface of distressed asphalt pavement. Factors that differentiate UTW from conventional concrete overlays of existing asphalt pavement are: (1) a substantial degree of bond between the concrete overlay and the prepared asphalt surface, and (2) much closer joint spacing.



PROPER APPLICATION

UTW is applied where a substantial thickness of asphalt exists, such as full-depth asphalt pavements (asphalt surface on asphalt base), or where multiple asphalt overlays were placed over time that exhibit recurring rutting and washboarding. The predominant use being rehabilitation of distressed asphalt pavement at intersections. Other uses include bus lanes, rural highways and parking lots. Because of the unique properties of the UTW pavement system, conventional concrete pavement thickness design procedures, such as those of PCA and AASHTO do not apply. Special design procedures for UTW can be found in ACPA's Ultra-thin Whitetopping (IS100P) and Whitetopping – State of the Practice (EB210P).

SPECIFICATIONS/DETAILS

Proper construction of ultra-thin whitetopping consists of four fundamental steps: 1. Prepare the asphalt surface by milling and cleaning, or water or abrasive blasting. 2. Place, finish, texture, and cure using conventional techniques and materials. 3. Saw joints to prevent cracking. 4. Open to traffic. A clean surface is required for proper bond. Milling the surface followed by cleaning improves bond because it exposes more of the aggregate of the asphalt pavement. The milling creates a rough surface that also enhances the bond between the two layers. If milling is not done, water or abrasive blasting should be used to clean the asphalt surface. When water blasting is used, the surface must be allowed to air dry before the concrete is placed. Once a surface is cleaned it is important to keep it clean until the concrete overlay is placed. Dust, dirt and debris that falls or blows onto the asphalt surface must be removed. If the surface is cleaned on the day prior to paving, air cleaning may be required on the day of paving to remove dirt and dust. If traffic is allowed on the milled surface, the surface must be re-cleaned prior to paving.

After surface preparation, there must be enough asphalt remaining to form a sufficient composite section that can carry the load. There must be enough asphalt to minimize concrete tensile stresses, and enough concrete to minimize asphalt strains. Based on U.S. experiences to date, it is recommended that the minimum asphalt thickness after milling exceed 3 inches.

Paving UTW isn't any different than paving any other concrete pavement. Conventional slip-form and fixed-form pavers, as well as small equipment - such as vibrating screeds - have all been used successfully, without major modifications.

Typical concrete finishing and texturing procedures are appropriate for ultra-thin whitetopping. Proper curing is critical to avoiding shrinkage cracking in the concrete overlay and to prevent de-bonding between the asphalt and concrete. Because the overlay is a thin concrete slab, it has high surface area to volume ratio and can lose water rapidly due to evaporation.

Curing compound should be applied at twice the normal rate. Care must be used during application in order to avoid spraying curing compound on a prepared asphalt surface, which will decrease bonding. Joints should be sawed with lightweight saws as early as possible to control cracking. Saw-cut depth should be 1/4 - 1/3 of overlay thickness. Typically, the joints are not sealed. They have performed well without sealant because the short joint spacing minimizes joint movement. Performance to date shows no benefit from sealant use.

On project SP-9999 (571), UDOT's special provision 02753S was used for an UTW project at the junction of SR-114 and SR-89 in Utah County (picture above).

COST INFORMATION

The installed cost, at 2002 dollars for UTW, is between \$20 and \$25 per square yard. This being based on single intersection projects. Larger projects of multiple interchanges would lower the cost somewhat.

FURTHER INFORMATION

Contact **Bill Lawrence @ (801) 965-4560, BillLawrence@utah.gov**

Contact **Mitzi McIntyre, Utah ACPA Executive Director @ (435) 647-5935 mcintyre@utahacpa.com**

ACPA UTW load-carrying capacity calculator:

<http://www.pavement.com/PavTech/Tech/UTWCalc/Main.asp>

ACPA - Fundamentals Concrete Pavement Resurfacing UTW:

<http://www.pavement.com/PavTech/Tech/Fundamentals/fundutw.html>

Ultra-thin Whitetopping in the USA: <http://www.pavement.com/techserv/USutw2.html>
